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point, where I failed to flush it again. I happened to have a charge of heavy shot in the other barrel and let it go. This is the only long flight I have seen and it reminded me of the flight of a water ouzel. The other two flights I have seen were short and rail-like.

Last November I was camped in the valley of the Tijuana River near the last monument of the boundary between California and Mexico. The lad before mentioned staid with me a few days and was accompanied by his pointer dog. We hunted the marshes several high tides but found but one California Black Rail. This flushed close to the boy's feet and was shot by him at very short range. He presented the skin to the Museum of Vertebrate Zoology and we now have three specimens there. The dog pointed several Clapper Rails (*Rallus levipes*) but failed to find the small species.

From my own observations and such information as I have been able to obtain from others I think that the California Black Rails are resident in the salt marshes along the coast of southern California, at least as a species; there may be a short individual migration but that remains to be proven. The nesting is probably early, March and April. Sets number four to eight, probably seldom the larger number. The nests are hidden in the *Salicornia* near the highest tide line, a few inches from the ground, and are often merely a few dead bits of *Salicornia* drawn together and tramped into place. It is practically impossible to make a positive identification unless it proves practicable to trap the parent at the nest.

The birds seem to lie very close and must be nearly stepped on before they will flush. I fancy that the species will be found fairly common in many localities when they are looked for carefully in the right places.

San Diego, California.

AMONG THE THRASHERS IN ARIZONA

By M. FRENCH GILMAN

WITH ONE PHOTO BY THE AUTHOR

THE territory in which the following notes were made lies in the Pima Indian Reservation along the Gila River. Observations covered a strip of country about twelve miles long by three miles wide, lying along the south side of the Gila. My two bases of operation were Blackwater, an Indian village of 1362 feet altitude, and Sacaton, where is located the Pima Agency and the Pima Training School. Sacaton has an elevation of 1275 feet and the distance between it and Blackwater is about ten miles.

Half a mile south of the Gila, and flowing parallel with it for about twenty miles is a small stream called the Little River. Along its banks are a few cottonwoods, many willows and much water-mote (*Baccharis glutinosa*). Between the two streams, on the "Island," as it is called, are groves of cottonwoods, and a few Arizona ash trees (*Fraxinus velutina*). In places not cleared and cultivated by the Indians, is a dense growth of mesquite (*Prosopis velutina*), screw-bean (*P. odorata*), and arrow-wood (*Pluchea sericea*), besides a number of scattered plants of squaw-berry (*Lycium berlandieri*) and jujube (*Zizyphus lycioides*).

About three miles south of the Gila runs, parallel, a broken range of large hills or small mountains and on the intervening strip are many species of the cactus family: the sahuaro or Giant Cactus (*Cereus giganteus*), 20 to 35 feet high or

even more; the cholla (*Opuntia fulgida*), tree-like and 12 feet high; the dense woolly cholla (*Opuntia bigelovii*); the bisnaga (*Echinocactus wislizenii*), which furnishes drink to the traveler in extremity; and others too numerous to describe here. The ocotilla with spiny tentacles waving ten or twelve feet in air, each crowned with crimson bloom, is a feature next the foothills. Shrubs seen are the creosote bush (*Covillea tridentata*); two salt bushes (*Atriplex canescens* and *A. lentiformis*); grease wood (*Sarcobatus vermicularis*); and a few others. Trees, so-called, in this stretch of country are the mesquite, screw-bean, ironwood (*Olneya tesota*), two species of palo verde (*Parkinsonia torreyana* and *P. microphylla*), and the crucifixion thorn (*Holocantha emoryi*).

This mixture, of river bottom, sloping upland to the hills, dry sand washes running from hill to river, and the hills themselves, makes a varied bird range, and judging from their numbers a perfect paradise for thrashers. Of these, five species are seen: Sage (*Oroscoptes montanus*); Palmer (*Toxostoma curvirostre palmeri*); Bendire (*T. bendirei*); Leconte (*T. lecontei*); and Crissal (*T. crissale*).

The Sage Thrasher is here only for the winter, and was first noted November 30. The last seen was March 30. They were not numerous at any time and occurred any place from river to hills.

Palmer, Bendire and Crissal thrashers were very numerous, and it is difficult to determine which predominated. The ranges of Palmer and Bendire coincided as near as I could judge, and they were both seen at many points from river to hill. Crissal, with a few exceptions, confined himself to the dense mesquite and other growth near the river bottom. In no case did I find any of the thrashers up any distance on the hills. Too barren and rocky, I believed.

Leconte Thrasher was very rare, only five pairs being seen the past year, and they were in or near the dry sand washes away from the river.

As far as I have observed the four species of *Toxostoma* are resident here. Some of them may leave for a short time in the fall but there seems to be no regular migration. Bendire in particular seems scarce during the latter part of September and during October and November, but is occasionally seen during all that time. It is probably its dormant period, to recuperate from the molt.

In the field it is somewhat difficult to be sure in distinguishing the three species, Palmer, Bendire and Crissal. At close range, or if the birds are near enough together to compare, it is easy enough; but at a distance a single bird may puzzle. In general it may be said that Crissal is darkest, has more curve to his bill and has a bobbing, jerky flight quite similar to that of the California Thrasher. Palmer is a little larger, apparently at any rate, is lighter in color and has much of the same jerky flight. Bendire is smallest and lightest of the three and has a smooth, even flight. Both Palmer and Bendire have obsolete spots on the breast and light tips to outside tail feathers, but Bendire has the more distinct spots and whiter tail tips. At close range, say on the nest, the eye is indicative. Crissal has a straw-colored iris; Palmer, orange; and Bendire, orange red. Leconte of course is unmistakable with his light sandy complexion and fast-running habit.

The Palmer and Bendire seem naturally much tamer than the others and come about homes quite frequently. All summer I placed pieces of watermelon in the shade of a school building—vacation time and no children about—and both these thrashers came freely and ate with a family of scolding Cactus Wrens. But never a Crissal appeared. The Palmer and Crissal dug in the garden and also ate wheat planted near by, and frequented the barn and well. They would come and drink from an iron kettle placed on the ground for the chickens. At the Casa Grande ruins the custodian had a large can placed so water from it dripped onto a milk

and butter cooler. This was against a window under the porch roof and a pair of Palmers would come and catch the drops of water as they fell. At a post trader's store near Blackwater the Palmer would come into a porch and drink from the drip of an olla or water cooler. Both Palmer and Bendire frequently sing from the tops of Indian homes and sometimes from the school house.

As for singing, the Bendire has them all beaten. The others are fine singers indeed, but their repertoire is limited. Not so with Bendire. No two seem to sing exactly alike and some of the songs are quite distinct from others. Not only in variety of notes but in arrangement, are differences noticed. He is a more constant singer than the others and I frequently discovered a nest by the song of the bird. The earliest date of singing was January 3, and I could hardly believe at first that Bendire was the performer. It was a low warbling song with a decided sparrow "burr" to it. I approached as near as the bird would allow, but could not be sure that he was the singer as no throat movement could be detected. When the bird flew, the song ceased and began again after he perched on a post. I repeated this maneuver several times before I was convinced that Bendire was warbling. Next evening I walked under a mesquite tree containing the singer and obtained a good close view of him and his performance.

As the breeding season approached they sang more often, the song becoming louder and with less of the burr, in fact more like the typical thrasher song, if such there be. The songs were all very pleasing, but the variations were often puzzling at first. Whenever I heard a new strain I said, "only another Bendire tuning up." They kept up the music till late in June and occasionally a song could be heard all summer and up to the last of September.

Palmer thrasher came next in frequency of vocal effort, and even during the summer months and September a part of their song might be heard. Crissal thrasher was apparently too busy raising young to sing much after early spring was gone, and rarely uttered his call note unless disturbed or the nest approached.

Molting was quite noticeable the last of July and all of August. Birds would be seen in all stages of undress; some being reduced to one feather for a tail and presenting a ragged appearance generally. When molting was completed and the new suit put on the birds looked fine and the darker shade was very noticeable. As the breeding season had advanced the birds became much lighter, especially the Palmer, tho all three showed a marked difference. And in their new coats the same relative comparison obtained.

During the season of 1908 I made notes on 112 thrashers' nests, apportioned among the four species as follows: Crissal, 45 nests; Bendire, 39; Palmer, 27; Leconte, 1. The respective numbers of nests may be a sort of index to the relative numbers of the species; and Crissal would lead. Judged by other standards the verdict is for Bendire, as his frequent singing keeps him in the lime-light and he is much in the public ear. Next would come Palmer, who talks much more than Bendire tho he sings less. His frequently uttered liquid notes of "queet-eet" may be heard all seasons of the year, and he is fond of perching in the top of a bush or on a post even when not singing. Crissal is the silent partner of the trio and by keeping to the low underbrush and thickets is seldom seen. His call notes of "queety-queety" are occasionally heard from the mesquites, and sometimes a song. It seems to me that Crissal sings less here than among the mesquites of the Salton Sink country in California. Perhaps it is because he is here in the numerous presence of superior talent, while there the humble Cactus Wren is his commonest competitor. Bendire's call note is a single "queet" and in addition I noticed a scolding note quite similar to that of the mockingbird, only prolonged and slightly

trilled. Occasionally I heard a scolding note from both Palmer and Crissal, something like "chä." Once while a Bendire was singing I saw a Gila Woodpecker fly and alight on the same branch near him. He at once ceased singing and used his "cuss" words and the Gila departed.

As thrashers were always favorites of mine I made extensive notes on the nests seen. The locality was most favorable as the Indians never molest them and hence they were quite tame generally.

The Crissal Thrasher (*Toxostoma crissale*) began nesting earliest of all. The first nest I found was February 29 and contained three eggs about hatched. March 1st I found four nests, three of three eggs each and one containing two young recently hatched. Of the 45 nests noted, one was in February, 27 in March, six in April, ten in May, and one containing two fresh eggs June 10. A list of Crissal's choice of nesting sites may be of interest. Twenty-seven were in mesquites and mostly in typical situation, i. e., close under a large limb, making it difficult in some cases to insert a hand in the nest. One was on top of a stump but hidden by dense, sprouting twigs. Eleven were in "squaw-berry" bushes, four in greasewood, one in a palo verde, one in a mistletoe and one in a low brush fence. The average height of the nest from the ground was three feet ten inches and the extremes were two feet and eight feet. One Crissal nest I saw is not included in the foregoing list. It was in a brush fence three feet from the ground and contained ten eggs of the Gambel Partridge (*Lophortyx gambeli*).

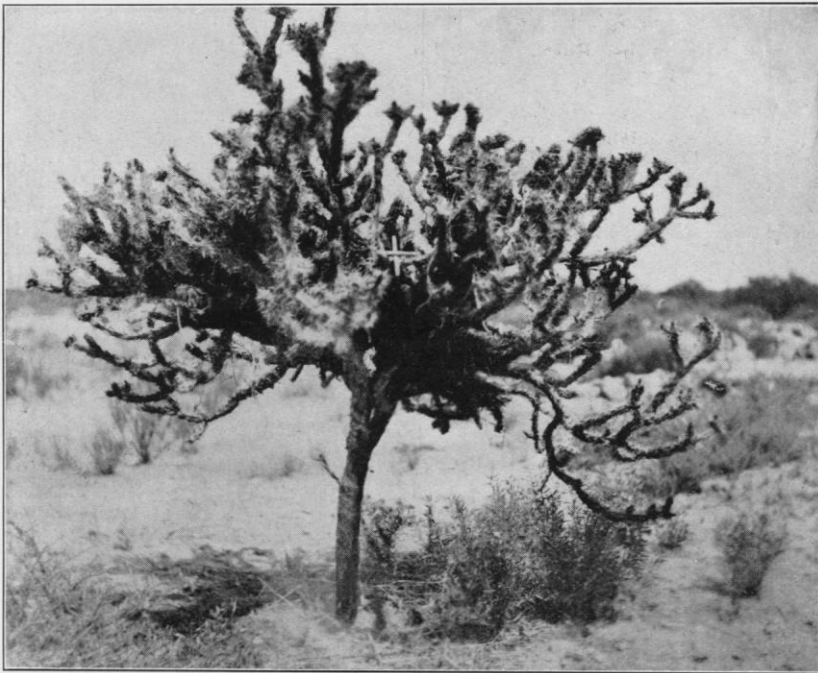
The Crissal is a rather close sitter and I could usually approach near enough to see the extremely curved bill and straw-colored eyes which sufficiently identified the bird. Upon too near an approach she would slip out the other side of the bush and perhaps give either the call or the scolding note, while I counted the eggs or young. If the nest contained young some solicitude was usually shown in which the male bird joined.

As compared with other thrashers here the nest is not much for architecture, being rather shallow and made of twigs and usually lined with fine rootlets. Sometimes a variation is shown, as one found had lining of white horse-hair; another some feathers, hair and grass; and others a little fine bark with the rootlets. I watched a nest from the time eggs were deposited till young left the nest. The set was completed April 6. At 6 A. M., April 20, one young was just out of the shell and the other egg pipped. At 6 P. M., the same date, both young were opening their mouths and trying to swallow my finger. No egg-shell could be found. May 6th both young birds left the nest. In California I found several sets of four eggs, but here three seems the rule and two are often found. None of four were seen. The short time from egg to leaving nest—30 days—probably allows the raising of more than one brood, and would account for such a protracted breeding season: five months, February to June inclusive.

The Palmer Thrasher (*Toxostoma curvirostre palmeri*) showed a decided preference for the cholla cactus as a nesting site. Of twenty-seven nests found, eleven were in the cholla; seven in the jujube, about as spiny as any cactus; four were in mistletoe of mesquite and cottonwood; two in Lycium, two in mesquite, and one in a clematis vine trailing over a shrub. The average distance from the ground was six and one-half feet, and extremes were two and one-half feet and ten feet. One old nest was found, in a mesquite five feet from the ground, containing thirteen eggs of the Gambel Partridge. Fourteen of the twenty-seven nests contained three eggs each; two had four eggs, and the rest two and one, some of the complete sets being two eggs.

Complete sets, partly incubated, were found March 1st. Of the nests noted,

twelve were found in March, ten in April, and five in May, the latest date being May 14. One nest in a cholla contained four young birds about half grown. Three weeks later another nest in the same cactus was found containing three fresh eggs. Possibly it was a second nesting of the same pair of birds. March 7 I removed a set of three eggs from a nest in a cholla, and on the 22d noticed some fresh grass lining in the nest. About a week later the nest contained two fresh eggs. In this case the birds evidently occupied the same nest a second time, something I have rarely seen except among Raptores. Another nest, also in a cholla, was found containing the usual number of three eggs. A second visit to the nest showed two of the eggs broken and nest deserted. I removed the shells and remaining egg and two or three weeks later found the nest again occupied by three fresh eggs, tho no fresh lining or repairs could be detected. About three weeks afterward I investigated and found the eggs addled and nest again deserted. As



CHOLLA CACTUS CONTAINING FIVE OLD CACTUS WREN'S NESTS, AND FOUR OLD
AND ONE NEW NEST OF THE PALMER THRASHER

the cactus was only a few yards from a trading post, and a few feet from a well-traveled road, the birds had probably been disturbed too often. This cholla was evidently a favorite nesting place as it contained at the time five old Cactus Wrens' nests and four old and one new nest of the Palmer Thrasher. The entire plant was less than five feet in height.

This thrasher is a close sitter and when disturbed leaves the nest, but soon returns showing much concern. Both parents usually show up, approaching as near as six feet and uttering the usual two-syllabled call, tho sometimes using the guttural scolding note. The nest is a bulky affair but well built. The nest proper is three or four inches deep, inside measurement, and above this is a superstructure or rim from two to three inches high. Several nests seen measured over six inches deep. Rather coarse twigs are used in the construction and the lining is mostly of

rootlets, tho some fine bark, hair or feathers may also be seen in some of the nests. The bird is not too proud to use a foundation already laid, as three nests were found built right on top of old Cactus Wrens' nests. The eggs are quite uniform in size, shape, color and marking, and are much larger than those of the Crissal, tho the birds do not differ much in measurement.

The Bendire Thrasher (*Toxostoma bendirei*) in nesting, as in song, showed more individuality. The eggs showed great variation in size and shape, but the most marked difference was in color and marking. The ground color was all shades between clay color or drab and light green; and the markings from fine specks to almost blotches, of many indeterminate shades. A great range in choice of nesting sites was noticed. Of the thirty-nine nests, thirteen were in *Lycium* bushes; three in mistletoe, in mesquite and catsclaw (*Acacia greggii*); three in palo verde, two in catsclaw, two in *Sarcobatus*, one in screw-bean, and one in a salt-bush. The average hight was five feet, and the extremes three feet and ten feet. Two nests, deserted as far as the thrashers were concerned, were found, each containing an egg of Gambel Partridge. This thrasher nests a little later than the others, the date of first nest and egg being March 7. In March I found seven nests; in April, twenty; in May, ten; and in June, two. The latest date was June 10 when a nest with one fresh egg was seen. The sets were mostly of three eggs, eighteen of that number being found. Only two sets of four were seen and several completed sets of two eggs were noted.

The nests are much finer in material and workbirdship than those of most thrashers. They are smaller, more compactly built and very symmetrical in their cupped shape. Finer twigs are used in the outside and they are fitted closely together. The lining is variously composed of horse-hair, thread, twine, pieces of cloth, grass, weeds, rootlets, fine bark, wool and cotton from bedquilts, etc., etc. Most of them contain more or less horse-hair, and if near an Indian home, as is often the case, twine and material from the bed covers enters largely into the lining. One nest I noticed was built against a Verdin's nest, the wall of the latter in fact forming part of one side of the thrasher's nest. Both nests contained eggs, so the proprietors were on very neighborly terms, even tho I could discover no doorway between the apartments. The Bendires are rather shy about the nest, leaving quietly before a near approach is made. Very few of them show any concern about the nest tho exceptions were noted. The first nest I found was of uncertain identity so I decided to wait for the bird's return. No bird appeared close enough to the nest to prove ownership and I had to make the third visit to the nest before Mrs. Bendire Thrasher was seen leaving home.

The three species seem to get along peaceably together. I found nests of Palmer and Crissal in shrubs only twelve feet apart and a Bendire's nest only a short distance away.

As stated before, the Leconte Thrasher (*Toxostoma lecontei*) seems rare here. One nest was found in a palo verde and contained two half grown young. Two old nests were found in chollas. Their nests are unmistakable to one familiar with them and all had the same lining, a felted composition of a small woolly plant. All the nests I have seen in California had the same lining so when I saw a similar nest here I did not need to await the bird's return. I did so, however, and the Leconte returned to feed the young, but hastily left when I was discovered.

Sacaton, Arizona.